

Amendments to the Claims

This listing of claims will replace all prior versions, and listings of claims in the application.

Claims 1. (Cancelled)

Claims 2-7. (Previously cancelled).

8. (New) A superscalar microprocessor for processing instructions having a program order, the microprocessor comprising:

 a fetch circuit configured to fetch instructions, including a conditional branch instruction, from an instruction store;

 a branch detection circuit configured to detect the conditional branch instruction from among the fetched instructions;

 a branch bias circuit configured to receive a branch bias signal indicating whether a conditional branch controlled by the conditional branch instruction is predicted to be taken or not taken;

 a stream identifier circuit configured to associate a stream identifier with one or more of the fetched instructions, thereby identifying a first stream predicted by the branch bias signal;

a buffer circuit configured to make a group of the fetched instructions concurrently available for execution, wherein the available instructions include the conditional branch instruction and an instruction from the first stream; and

an execution circuit including a plurality of functional units configured to execute the available instructions out of the program order, wherein execution of the conditional branch instruction determines whether the conditional branch is taken,

wherein the fetch circuit is further configured to cancel instructions from the first stream based on the stream identifier in the event that the branch bias signal incorrectly predicts whether the conditional branch is taken.

9. (New) The superscalar microprocessor of claim 8, wherein the functional units concurrently execute a first instruction and a second instruction, wherein according to the program order the first instruction is prior to the conditional branch instruction and the second instruction is an instruction from the first stream that is subsequent to the conditional branch instruction.

10. (New) The superscalar microprocessor of claim 8, wherein the stream identifier comprises a stream bit.

11. (New) The superscalar microprocessor of claim 8, wherein the stream identifier indicates an occurrence of a control flow change associated with the conditional branch instruction.

12. (New) The superscalar microprocessor of claim 8, wherein the stream identifier is associated with a predetermined number of the fetched instructions.
13. (New) The superscalar microprocessor of claim 8, wherein the fetch circuit fetches one or more instructions of a second stream not predicted by the branch bias signal before the conditional branch instruction is executed.
14. (New) The superscalar microprocessor of claim 8, further comprising a register file including a plurality of entries configured to store data including result data generated by the plurality of functional units, wherein each of the plurality of entries is accessible by reference to a respective location in the register file.
15. (New) The superscalar microprocessor of claim 8, further comprising an instruction retirement circuit configured to receive operation completion information from the plurality of functional units and to retire the executed instructions according to the program order.
16. (New) The superscalar microprocessor of claim 15 wherein the fetch circuit fetches one or more instructions of a second stream not predicted by the branch bias signal before the conditional branch instruction is retired.
17. (New) The superscalar microprocessor of claim 8, further comprising an instruction retirement circuit configured to receive result data from the plurality of functional units,

the result data including branch result data associated with the conditional branch instruction, and to confirm the result data according to the program order.

18. (New) The superscalar microprocessor of claim 17, wherein the fetch circuit fetches one or more instructions of a second stream not predicted by the branch bias signal before the branch result data is confirmed by the instruction retirement circuit.

19. (New) The superscalar microprocessor of claim 8, wherein the buffer circuit is further configured to cancel instructions from the first stream based on the stream identifier in the event that the branch bias signal incorrectly predicts whether the conditional branch is taken.

20. (New) In a superscalar microprocessor, a method for processing instructions having a program order, the method comprising the steps of:

fetching instructions from an instruction store;

detecting a conditional branch instruction from among the plurality of fetched instructions;

receiving a branch bias signal associated with the conditional branch instruction, the branch bias signal indicating whether the conditional branch is predicted to be taken or not taken;

associating a stream identifier with one or more of the fetched instructions, thereby identifying a first stream predicted by the branch bias signal;

making a group of the fetched instructions concurrently available for execution, wherein the available instructions include the conditional branch instruction and an instruction from the first stream;

executing the available instructions out of the program order, wherein execution of the conditional branch instruction determines whether the conditional branch is taken;

determining, based on the execution of the conditional branch instruction, whether the branch bias signal correctly predicted whether the conditional branch is taken; and

in the event that the branch bias signal incorrectly predicted whether the conditional branch is taken, canceling instructions from the first stream based on the stream identifier.

21. (New) The method of claim 20, wherein the executing step includes concurrently executing a first instruction and a second instruction, wherein according to the program order the first instruction is prior to the conditional branch instruction and the second instruction is an instruction from the first stream that is subsequent to the conditional branch instruction.

22. (New) The method of claim 20, wherein the stream identifier comprises a stream bit.

23. (New) The method of claim 20, wherein the stream identifier indicates an occurrence of a control flow change associated with the conditional branch instruction.

24. (New) The method of claim 20, wherein the stream identifier is associated with a predetermined number of the plurality of instructions.

25. (New) The method of claim 20, wherein the fetching step further includes fetching instructions from a second stream not predicted by the branch bias signal prior to execution of the conditional branch instruction.

26. (New) The method of claim 20, further comprising the steps of:

receiving operation completion information generated during the step of executing; and

retiring the executed instructions according to the program order in response to the operation completion information,

wherein the step of fetching includes fetching instructions from a second stream not predicted by the branch bias signal prior to retiring the conditional branch instruction.

27. (New) The method of claim 20, further comprising the steps of:

receiving operation completion information and result data generated during the step of executing, the result data including branch result data generated during execution of the conditional branch instruction; and

confirming the result data according to the program order and in response to the operation completion information,

wherein the step of fetching and buffering includes fetching instructions from a second stream not predicted by the branch bias signal prior to confirming the branch result data.

28. (New) A computer system, comprising:

a memory;

a superscalar microprocessor for processing instructions having a program order;

and

a bus,

wherein the microprocessor includes:

a fetch circuit configured to fetch instructions, including a conditional branch instruction, from an instruction store;

a branch detection circuit configured to detect the conditional branch instruction from among the fetched instructions;

a branch bias circuit configured to receive a branch bias signal indicating whether a conditional branch controlled by the conditional branch instruction is predicted to be taken or not taken;

a stream identifier circuit configured to associate a stream identifier with one or more of the fetched instructions, thereby identifying a first stream predicted by the branch bias signal;

a buffer circuit configured to make a group of the fetched instructions concurrently available for execution, wherein the available instructions include the conditional branch instruction and an instruction from the first stream; and

an execution circuit including a plurality of functional units configured to execute the available instructions out of the program order, wherein execution of the conditional branch instruction determines whether the conditional branch is taken,

wherein the fetch circuit is further configured to cancel instructions from the first stream based on the stream identifier in the event that the branch bias signal incorrectly predicts whether the conditional branch is taken.

29. (New) The system of claim 28, wherein the functional units concurrently execute a first instruction and a second instruction, wherein according to the program order the first instruction is prior to the conditional branch instruction and the second instruction is an instruction from the first stream that is subsequent to the conditional branch instruction.

30. (New) The system of claim 28, wherein the stream identifier comprises a stream bit.

31. (New) The system of claim 28, wherein the stream identifier indicates an occurrence of a control flow change associated with the conditional branch instruction.

32. (New) The system of claim 28, wherein the stream identifier is associated with a predetermined number of the fetched instructions.

33. (New) The system of claim 28, wherein the fetch circuit fetches one or more instructions of a second stream not predicted by the branch bias signal before the conditional branch instruction is executed.

34. (New) The system of claim 28, wherein the microprocessor further includes a register file including a plurality of entries configured to store data including result data generated by the plurality of functional units, wherein each of the plurality of entries is accessible by reference to a respective location in the register file.

35. (New) The system of claim 28, wherein the microprocessor further includes an instruction retirement circuit configured to receive operation completion information from the plurality of functional units and to retire the executed instructions according to the program order.

36. (New) The system of claim 35, wherein the fetch circuit fetches one or more instructions of a second stream not predicted by the branch bias signal before the conditional branch instruction is retired.

37. (New) The system of claim 28, wherein the microprocessor further includes an instruction retirement circuit configured to receive result data from the plurality of functional units, the result data including branch result data associated with the conditional branch instruction, and to confirm the result data according to the program order.

38. (New) The system of claim 37, wherein the fetch circuit fetches one or more instructions of a second stream not predicted by the branch bias signal before the branch result data is confirmed by the instruction retirement circuit.

39. (New) The system of claim 28, wherein the buffer circuit is further configured to cancel instructions from the first stream based on the stream identifier in the event that the branch bias signal incorrectly predicts whether the conditional branch is taken.